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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/583,033	06/15/2006	Hideki Yoshikawa	520.46263X00	6757
20457 7590 11/23/2010 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873				
EXAMINER				
BRUTUS, JOEL F				
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3777				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/583,033

**Applicant(s)**

YOSHIKAWA ET AL.

**Examiner**

JOEL F. BRUTUS

**Art Unit**

3777

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6, 8-10 and 18-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-10 and 18-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6, 8 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Pat: 6,261,234) in view of Hossack et al (US Pat: 6,045,508) and further in view of Otsuka et al (US Pat: 6,263,089).

Regarding claims 1-2, Lin discloses an apparatus with transducer 102 or 202 and transducer 104 or 204 for providing simultaneous viewing of an instrument in two ultrasound intersecting imaging planes 110 and 112 [see abstract, figs 1, 3B-C, 4A and 5]. Lin disclose instrument path 114 or 212 is positioned with respect to the planes such that an instrument may be simultaneously viewed in both imaging planes; the instrument path is provided at an intersection that, at least partially, defines the intersection of the two imaging planes [see abstract, figs 1, 3B-C, 4A and 5].

Lin discloses the instrument path lies on a line that defines the intersection of the imaging plane 110 and the imaging plane 112. As such, simultaneous viewing in the imaging plane 110 and the imaging plane 112 of an instrument that is guided (meaning

motion of the instrument can be detected, emphasis added) along the instrument path 114 may be provided [see column 3 lines 55-67, column 4 lines 1-8].

Lin discloses a biplane image of the instrument and/or structures in proximity thereto may be generated by processing the image provided by each of the imaging plane 110 and the imaging plane 112 [see column 3 lines 55-67, column 4 lines 1-8].

Lin discloses a 3D orientation, comprising a composite of two images, each provided by one of the imaging plane 110 and the imaging plane 112, may be provided [see column 3 lines 55-67, column 4 lines 1-8]. Lin further discloses interleaving of images from the two imaging planes may be used to generate the composite of two images. The probe is coupled to a display system, which includes circuitry and a monitor/display for viewing single or biplane images generated by transducers 102 and 104 [see column 3 lines 55-67, column 4 lines 1-8].

Lin doesn't explicitly mention extracting an estimation region used for estimating a motion of the object; the images from the transducer are two-dimensional and PZT elements array.

However, Otsuka et al teach determining velocity components of three dimensional motion of an object [see column 9 lines 1-30]. In addition, Otsuka et al disclose a feature extraction unit 108 comprises an intersection line histogram obtaining unit 150 coupled to a velocity estimator unit 152 [see fig 7] and fig 8 shows an intersection line along tangent planes and motion trajectory [see fig 8]. Otsuka et al disclose measuring features such as movement, position of a target within the image [see column 7 lines 20-30].

Furthermore, Hossack et al teach the ultrasound transducers are constructed of piezoelectric material [see column 4 lines 50-60]. As well known in the art, first and second transducer arrays transmit ultrasonic waves to an object and acquire reflection signals from the object (emphasis added).

Hossack et al disclose multiple two dimensional image data are accumulated and assembled into a three dimensional volume [see column 5 lines 12-45] and further mention figs 1-3 can be used to reconstruct three dimensional images [see column 5 lines 7-8]. Hossack et al teach a motion estimator 138 [see fig 4 and 6] which receives images data from both transducer arrays, that is capable of estimating/detecting a three dimensional motion of the object from the reflection signals (emphasis added and see column 7 lines 10-35).

Therefore, one with ordinary skill in the art at the time the invention was made would be motivated to combine Lin with Hossack et al and with Otsuka et al by determining or producing velocity components of three dimensional motion of an object for analysis purposes and to produce velocity component of target or feature positioned on an intersection line of the two 2D cross section images of Hossack et al; in order to locally obtain a most dominant velocity component even from a target which is a non-rigid body such as a temporal structure and deforms, appears and disappears [see column 7 lines 40-45, Otsuka et al].

Regarding claim 18, all other limitations are taught as set forth by the above teaching.

Lin discloses a sequencer 420 coupled to the transducers controlling the acquiring of image frames [see column 6 lines 13-40].

In addition, Hossack et al teach the arrays can acquire image data simultaneously or sequentially [see column 5 lines 10-20 and 53-60]. Since the arrays can operate sequentially, first and second transducer arrays; the first and second two dimensional images are acquired in sequential frames (emphasis added).

Regarding claims 3, 5 and 8, Lin discloses the probe is coupled to a display system, which includes circuitry and a monitor/display for viewing single or biplane images generated by transducers 102 and 104 [see column 3 lines 55-67, column 4 lines 1-8 and figs 1, 3B-C, 4A and 5] would show biplane images change.

In addition, Hossack et al teach in figs 15-16, displays indicating movement or motion; where the cross section is changed [see figs 15-16].

Regarding claim 6, all other limitations are taught as set forth by the above teaching.

Lin doesn't teach a correlation function of a plurality of one-dimensional signals.

However, Hossack et al teach two and three dimensional [see above].

Therefore, one with ordinary skill in the art at the time the invention was made would have been motivated to combine Lin with Hossack et al by using one-dimensional because it's cost effective.

Regarding claims 4, 19-20, all other limitations are taught as set forth by the above teaching.

Lin doesn't teach if motion is lower than a predetermined value; produce a motion with calculating a mutual correlation.

Applicant describes a mutual correlation function as suppressing or extracting a contour or speckle component to indirectly estimate motion [see 0067, specification].

However, Hossack et al teach a motion estimator 138 that compares sequences of frames to estimate a component of motion [see column 7 lines 1-10] and supplied the estimated motion to a calculator that calculates a value defining the best estimate of movement between frames [see column 7 lines 10-20]. Hossack et al teach in figs 15-16, displays indicating movement or motion.

Nevertheless, Otsuka et al teach contour or edge is used to acquire motion [see column 7 lines 10-15 and abstract].

Therefore, one with ordinary skill in the art at the time the invention was made would have been motivated to combine Lin with Hossack et al and Otsuka et al by comparing the motion value to a predetermined value and to combine Lin with Hossack et al and Otsuka et al by using contour or edge to calculate motion; for accuracy purposes.

3. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Pat: 6,261,234) in view of Hossack et al (US Pat: 6,045,508) and further in view of

Otsuka et al (US Pat: 6,263,089) as applied to claim 1 above and further in view of Coleman et al (US Pat: 4,932,414).

Regarding claims 9-10, all other limitations are taught as set forth by the above combination.

Hossack et al don't teach an ultrasonic therapeutic device.

However, Coleman et al teach diagnostic ultrasonic system with a therapeutic ultrasonic system and diagnostic portion of the system provides three- dimensional and/or cross-sectional images of the tissue under scrutiny in real- time [see column 3 lines 2-7].

Therefore, one with ordinary skill in the art at the time the invention was made would have been motivated to combine Lin with Coleman et al by using the therapeutic transducer assembly and the diagnostic transducer and the teaching of a display format that superimpose on a B-mode image [see column 3 lines 62-64] as taught by Coleman; for the purpose of better diagnosing the region of interest to provide an accurate evaluation as to prescribe the best possible treatment.

### ***Response to Arguments***

4. Applicant's arguments with respect to claims 1-6, 8-10 and 18-20 have been considered but are moot in view of the new ground(s) of rejection.
5. The 112 rejection of the previous office action is moot due to the amendments to the claims.

**Conclusion**

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL F. BRUTUS whose telephone number is (571)270-3847. The examiner can normally be reached on Mon-Fri 7:30 AM to 5:00 PM (Off alternative Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. B./  
Examiner, Art Unit 3777

/Tse Chen/  
Supervisory Patent Examiner, Art Unit 3777